

Klamath National Forest

Best Management Practices

REGION 5 EVALUATION PROGRAM WATER QUALITY MONITORING REPORT

Evaluation of
Forest Service Administered Projects
Including, Timber Sales, Roads,
Prescribed Fire, Mining Activities
and Revegetation Activities During
1998

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**KLAMATH NATIONAL FOREST
1998
BEST MANAGEMENT PRACTICES (BMP)
EXECUTIVE SUMMARY**

1998 represented the seventh year of the BMP evaluation program on the Klamath National Forest. This program is designed to evaluate the effects of Forest land management practices and activities on water quality. On-site evaluations have been divided into 28 categories that reflect timber, engineering, recreation, grazing, fire, mining, and vegetative activities and programs.

In 1998, 61 projects or sites were reviewed for BMP implementation and/or effectiveness evaluation. The types of projects monitored were in timber (10), roads (13), recreation (2), grazing (8), fire (15), mining (7), vegetation manipulation (4), and revegetation (2).

The monitored activity areas occurred on Happy Camp, Salmon River, Scott River (including the Oak Knoll area), Goosenest and Ukonom Ranger Districts

BMP "Implementation" short comings involve (1) not doing what we said we were going to do and (2) project document insufficiency. BMP "Effectiveness" failings suggest water quality protection measures were ineffective. The table below summarizes the results of the BMP evaluation program for 1998, as well as for previous years.

Monitoring Years	Total # Sites Monitored	Sites Meeting BMP Monitoring Criteria			
		Implementation		Effectiveness	
		# of Sites	% of Total	# of Sites	% of Total
1992	53	29	55%	43	81%
1993	77	61	79%	72	94%
1994	52	39	75%	46	89%
1995	77	64	83%	74	96%
1996	57	48	84%	56	98%
1997	60	60	100%	59	98%
1998	61	38	62%	30*	86%

*26 sites did not evaluate BMP effectiveness and they were not used to determine % of Total

BMPs were successfully implemented on 62% of the sites evaluated. BMP effectiveness standards were met on 86% of the sites evaluated. This represents a significant decrease in BMP implementation and effectiveness compared to recent years.

BMP performance in 1998, relative to previous years, may have been due to several factors, such as, 1) more rigerous monitoring (change in personnel), 2) more in-season broadcast burns evaluated than previous years, and 3) more soil erosion related BMPs reported than in previous years.

The following table displays BMP implementation and effectiveness data for each selected BMP.

BMP	Total # of Sites	Implementation		Effectiveness	
		# of Sites	% of Total	# of Sites	% of Total
T02	7	7	100	7*	nd
T05	2	2	100	1	50
E12	1	1	100	1	100
E13	5	5	100	5	100
E17	5	2	40	5	100
E20	3	3	100	3	100
R22	2	1	50	1	50
G24	8	6	75	5	63
F25	15	3	20	15*	nd
M26	7	6	86	7	100
V28	4	0	0	4*	nd
V29	2	2	100	2	100

* BMP effectiveness not determined for these sites. These were concurrent BMP monitoring.

Areas in need of improved BMP implementation:

- snow removal (40% passing)
- developed recreation sites (50% passing)
- prescribed fire (20% passing)
- tractor piling (0% passing)

Areas in need of improved BMP effectiveness:

- wet weather operations (50% passing)
- developed recreation sites (50% passing)
- grazing (63% passing)

SUMMARY OF ALL SITES by Project Type

BMP T02 Skid Trails

Six partial-cut tractor harvested units on the Goosenest Ranger District were reviewed for existing ground disturbance and soil cover. These units are in the proposed Five Point Timber Sale. Slopes ranged from 0 to 30 percent with the majority of slopes less than 10%. Table 1 displays the amount of disturbance for each monitored unit. It is assumed that the main skid trails have had the surface soil displaced and have the highest compaction compared to secondary skid trails and undisturbed areas.

Table 1. Percent disturbance in previously partial-cut tractor harvested units.

<u>Project</u>	<u>Unit</u>	<u>Slope</u>	<u>Main Skid Trails</u>	<u>Secondary Skid Trails</u>	<u>Total Disturbance</u>
			----- % -----		
Snow Park Thin TS	3	0-6	20	7	27
5 Points TS*	56	17	13	8	21
	46	30	27	16	43
	52	1	13	--	13
	41	2-18	7	30	37
<u>Little Horse Peak TS</u>	<u>14</u>	<u>10</u>	<u>20</u>	<u>7</u>	<u>27</u>

Note: *Proposed timber sale in planning stage. Data represents existing conditions.

The data displayed in Table 1 shows that three units met the 15% disturbance guideline. Little or no erosion was observed on these skid trails so the high amounts of soil disturbance did not result in increased erosion.

Table 1 displays skid trails as main and secondary skid trails. Main skid trails usually have substantial soil displacement and soil compaction. Normally, more than 3 hauling passes have occurred on these trails. Secondary trails have little to no soil displacement and slight to none compaction with 1-2 hauling passes. The BMP evaluation form makes no distinction between type of skid trail. It also indicates that to fully meet BMP effectiveness, skid trails should occupy <10% of the unit. Minor departure from the standard is 10-15% of the unit. Any value exceeding 15% is considered a significant departure from the standard.

Skid trails on a winter partial-cut tractor harvested unit (logged over snow) were reviewed. Four main skid trails leading to two landings were monitored for rutting. Table 2 shows the results of this monitoring.

Table 2. Percent of skid trail rutted during logging over snow.

<u>Landing</u>	<u>Skid Trail</u>	% of Skid Trail
		<u>Rutted</u>
A	1	52
	2	24
B	1	16
	2	14

T05 Wet Weather Operations

Erosion control work on the Cub Timber Sale (Scott River RD) was monitored. Erosion control measures were adequately implemented. On one site, rutting occurred on the landing but did not result in soil material leaving the site.

Erosion control measures on the second site were adequately in place. A major storm hit the site and deposited 15 inches of precipitation in 5 days. Some turbid water left the landing and was transported to the nearest channel. Operation closure during wet weather did not prevent rutting or puddling. Sediment was transported to a channel.

A second review of the Cub TS showed that implementation of wet weather operations contract specifications were very effective. Erosion control practices were effective in preventing sediment from reaching the SMZ.

E12 Servicing and Refueling on Landing

One site on the Cub TS was visited. Contract requirements were fully implemented and were effective. No fuel was observed outside the containment area. Containment was achieved by using a heavy duty plastic basin (tub) with the fuel tank inside this tub.

E13 In-channel Construction Practices

Four ERFO sites and one cost-share project were reviewed. BMPs at all four ERFO sites were effectively implemented. Erosion control measures were effective in their performance.

BMPs at the cost-share bridge repair project met contract requirements. Erosion control measures were effective and no differences were noted in riffle substrate.

E17 Snow Removal

Segments of 5 roads were monitored during snow removal activities. BMP requirements were properly implemented on two road segments and not on three segments. Implementation failures were due to the plow blade set too low which allowed the removal of roadway surface rock or native materials.

E20 Traffic Control During Wet Periods or Road Closure

The Cannon TS (Scott River RD) and Ten Bear TS (Ukonom RD) were monitored for wet season hauling on Forest roads. Monitoring occurred between April 1 and May 5, 1998. The following roads were monitored: 13N11, 43N19, and 44N45. Roads 44N45 and 13N11 were treated for wet season use. These two roads showed little to no evidence of rills and no evidence of sediment transport to SMZ areas. Some rutting was present but was less than 10% linear length of the sampled roads.

Road 43N19 was designated for season operations and was closed during this period. There was little to no evidence of rills and rutting. There was a minor amount of sediment deposited in the SMZ but this material did not reach the stream channel.

R22 Developed Recreation Sites

Two recreations sites were monitored. These sites were Ti Bar Flat River Access (Ukonom) and Sulphur Springs Campground (Happy Camp).

Ti Bar Flat

This site did not meet the intent of this BMP due to the toilet facility located within 100 feet of a body of water. This site has also been used as an emergency landslide waste disposal area. The 1997 flood removed fine materials from the waste area. Vegetation is recovering. Use of this area as a waste areas was discontinued in 1995. The District proposes to decommission the existing toilet facility and replace it with a portable chemical toilet which will be serviced once a month. A site concept plan was developed in 1995.

Sulphur Spring Campground

This facility is currently meeting Forest Service Standard and Guidelines for campground operation. The BMPs are being properly implemented.

G24 Range Management

This BMP is currently undergoing revision and the results of this years monitoring should be considered as informal.

Five grazing allotments were reviewed. These consisted of Shackleford (Scott River), Dry Lake and East Beaver (Oak Knoll), Horsethief and Mt. Hebron (Goosenest). Table 3 displays percent utilization objective, percent utilization and percent stream bank alteration for each monitored area. Utilization

plot data is from upland sites and not riparian areas. It has been recommended that utilization plots be installed in riparian areas for future monitoring needs.

Shackleford Allotment

Lower Shackleford Creek and Log Lake areas of the allotment were reviewed.

Lower Shackleford Creek

BMP implementation is being met for herbaceous utilization, woody utilization and stream bank alteration (Table 3). BMP effectiveness is being met for ground cover and bank stability.

Log Lake Meadow

BMP implementation and effectiveness are being met for herbaceous utilization, woody utilization and stream bank alteration (Table 3).

East Beaver Allotment

Meadows on West Long John and Hungry Creeks were reviewed. Both of these areas are effectively implementing BMPs regarding herbaceous and woody vegetation utilization. Stream bank alteration is approaching excessive at 32% but without a standard it is difficult to determine where the detrimental cut off is.

Dry Lake Allotment

The Dead Cow Creek was reviewed. BMP implementation is not being met regarding forage utilization and stream bank alteration. Forage utilization is 80% and stream bank alteration is 67%. This severe bank alteration does not appear to be producing detrimental sediment .

Table 3. Percent of forage utilization and stream bank alteration for each reviewed site.

Allotment Name	Site	Utilization Objective	Utilization %	Bank Alteration	Meets BMP
Shackleford	L. Shackleford	50-60	<50	8	yes
	Log Lake	60	35-50	13	yes
East Beaver	W. Long John	45-60	40-50	32	yes
	Hungry	40-50	30	7	yes
Dry Lake	Dead Cow	40	80	67	no
Horsethief	Bull Meadows	40	44-53	27	no

	L. Horsethief M.	30	>30	63	no
Mt. Hebron	Horsethief Ck.	50	nd	<5	yes

Note: "nd" is defined as not determined.

Horsethief Allotment

Bull Meadows

Two sites were reviewed in this meadow. The lower site met BMP implementation for forage utilization (28-35%) and stream bank alteration (24% altered). The upper site did not meet BMP implementation for forage utilization (60-70%) but met BMP for stream bank alteration (31% altered).

Lower Horsethief Meadow

This meadow showed a significant amount of stream bank alteration (63%). Forage utilization was not measured. Due to the high amount of altered stream bank, this meadow was considered as not meeting this BMP.

Mt. Hebron Allotment

The site monitored was very rocky with an intermittent channel. There were no noticeable grazing impacts.

F25 Prescribed Fire

Fifteen units were burned using prescribed fire as a management tool. Eight units used an in-season broadcast burn prescription, four units used a spring broadcast burn prescription, three used a fall underburn prescription, and three used a fall broadcast burn prescription. Distribution of reviewed units was seven on Happy Camp RD, three on Oak Knoll RD, two on Ukonom RD, two on Goosenest RD and one on the Scott River RD.

Eighty percent of the units did not meet BMP implementation due to: 1) not including objectives for soil and water protection in the burn plans; 2) or the burn did not meet the resource management objectives for soil and water. Looking only at meeting or not meeting LRMP soil cover objectives, 60% of the units did not meet their soil cover objectives. Table 4 displays soil cover objectives and post-burn total soil cover values.

Table 4. Post-burn total effective soil cover for sampled units.

Project	Unit	Burn Prescription	LRMP Soil Cover Objective	Post-burn Cover	Meets LRMP Objective
			----- % -----		
Doolittle TS	159	early in-season burn	60	45	no
Outside TS	59	late in-season burn	50	42	no
	60	late in-season burn	50	55	yes
	126	late in-season burn	50	62	yes
	196	late in-season burn	50	28	no
	133	late in-season burn	50	26-73	no
	142	late in-season burn	50	22	no
	1026	late in-season burn	50	37	no
	1039	late in-season burn	50	23	no
Long John TS	75	spring burn	80	76	yes
	74	spring burn	80	68	no
Meridian TS	25	spring burn	80	71	no
Blue Jay UB		fall underburn	50	83	yes
Mud Lake UB		fall underburn	60	91	yes
Sharp UB	50A	fall underburn	60	79	yes

The units in Table 4 were part of the Concurrent Monitoring Program and BMP effectiveness was not determined for these units because they had not gone through one winter as required by BMP monitoring guidelines for prescribed fire. BMP effectiveness will be determined during the summer of 1999.

M26 Mining Operations

Seven mining operations were reviewed for BMP compliance. The distribution of monitored operations are as follows: Salmon River RD (2), Happy Camp RD (2), Scott River RD (1), Ukonom RD (1) and Oak Knoll RD (1). Eighty-six percent (6 sites) of the mining operations effectively implemented BMP

guidelines. Only one mining operation did not fully implement BMPs. Reasons for not meeting implementation criteria were 1) new road did not follow flagged route (mine operation outside of designated limits); 2) new section of road did not contain waterbars (erosion control work not done prior to wet season); 3) erosion control work not implemented; and 4) hazardous materials (fuel oil in drums) on site not properly protected from possible spills.

All seven mining operations met BMP effectiveness criteria.

V28 Vegetation Manipulation

Four tractor piling sites were reviewed. Two sites were on the Ukonom RD and two sites were on the Scott River RD. These projects failed to properly implement this BMP. These sites were not evaluated for BMP effectiveness because they had not undergone one full wet season. These four sites will be revisited during the summer of 1999 for effectiveness evaluation. Table 5 display post-treatment soil cover data for these four sites.

Table 5. Post tractor-piling total effective soil cover for sampled units.

<u>Project</u>	<u>Unit</u>	<u>Soil Cover</u>	
		<u>Objective</u>	<u>Post-piling Cover</u>
		-----	% -----
Outside TS	1115	50	32
	123	50	16
Lick TS	1	70	26
	4	70	28

V29 Revegetation of Surface Disturbed Areas

Two road decommissioning sites were reviewed on the Salmon River RD. BMP implementation and effectiveness were both successfully achieved. The soil cover on one site was >80% of the project soil cover objective. No adverse effects were noted from this slight decrease in soil cover.

PROBLEMS, EFFECTS AND REMEDIES

T02 Skid Trails

The Forest LRMP and Regional Soil Quality Standards indicate that no more than 15% of land dedicated to growing vegetation should be in skid trails and landings. The data in Table 1 shows that 50% of the stands would not meet the 15% guideline when using just main skid trails.

The remedy to this situation is to only use main skid trails and more endlining for future harvesting entries and to limit the number of skid trails used to <15% (area basis). This will involve earth science input during skid trail layout. The degree of disturbance and its impact on soil productivity needs more investigation because the use of more ground disturbing equipment (feller buncher, etc.) will be more common in the future.

More winter logging operations need to be monitored to determine the extent of skid trail rutting from operating on marginal snow operations. Also, communications with sale administrators can provide their opinion on the normal results of winter logging on skid trails

T05 Wet Weather Operations

Basically, wet weather operations were successful except when a major storm occurred. Most normal erosion control measures work for normal or most precipitation events. Major or extreme storm events will almost always cause problems. Wet weather operations will continued to be monitored.

E17 Snow Removal

More awareness on part of operators is needed to ensure that proper snow removal practices are followed. There may need to be site evaluation at beginning of plowing operations to get the project started off correctly and train operators.

R22 Developed Recreation Sites

The site that did not meet BMPs is being fixed this year which will solve the potential for human waste contamination of nearby flowing water.

G24 Range Management

Dry Lake Allotment

The main problem is that Dead Cow meadow is at the junction of 3 allotments and is a prime grazing area. There is a tendency for the cows from the three allotments to congregate in this meadow. The District has come up with some requirements for the permittees to follow to reduce the number of animals that use this meadow or duration of grazing. The burden will be on the permittees to reduce the use of this meadow and show that their animals are not harming the meadow and channel banks. The area monitored is an unusually heavy use area and does not reflect the overall condition of the allotment.

Horsethief Allotment

It appears that most of the bank alteration occurred after September 15. The District may consider shortening the grazing season in order to have cows off by August 30 as an example.

F25 Prescribed Fire

There is a real problem with prescribed fire in wildfire burned areas that are salvage logged and in need of reforestation. The litter and duff layers had been removed by the wildfire. Fire sprouting shrub species dominate and can totally cover the site. The size class distribution of downed fuels creates a more difficult burn prescription which is harder to achieve. There is probably no easy remedy to this problem other than burning with a less intense fire and maybe reduced expectations of conifer recovery of those acres.

Spring broadcast burns, while not meeting soil cover guidelines (66% did not meet guidelines), did retain sufficient soil cover to keep soil erosion to a minimum. In terms of soil protection, these sites were successful. Retaining 80% soil cover can be very difficult for any burn prescription to achieve other than a underburn prescription.

It's suggested that the District continue with spring broadcast burns but monitor fuel moisture very closely in order to burn during the highest fuel moisture period as possible. Burn at beginning of open window when 80% cover is needed and latter in the spring burn season for 60-70% cover objectives.

It is also very important to include the proper soil cover objectives in the Burn Plan. Some Burn Plans use the wrong soil cover objectives or just refer to the LRMP soil cover guidelines without specifying what the soil cover guideline actually is. Failure to include soil and water resource objectives in Burn Plans, regardless of the percent soil cover retained, will cause the BMP evaluation database to automatically fail the BMP Implementation section. It is very important to include the soil/water resource objectives in the Burn Plans. This information will be shared with the district fire management officers.

V28 Vegetation Manipulation

It has been proposed to District personnel that the Forest soil scientist will be at each tractor piling site when operations first begin. This will allow communication between soils, silviculture, fire and dozer operator. The problem is probably visual awareness of what the soil cover objective looks like on the ground. Awareness training by soil scientist and on-site soil cover monitoring as the project begins should solve the problem.

BMP ACTION ITEMS IN 1998

Concurrent Soil Cover Monitoring

Soil cover monitoring procedures were developed for the Klamath National Forest and field tested on 24 units. Soil cover monitoring was done on various burn prescriptions and tractor piling. Soil disturbance classes were monitored on a proposed timber sale and one active timber sale.